shipping on that side, but on the west side a gap in the belt of reefs enables vessels of large tonnage to penetrate into a bay formed by the embouchures of two small rivers, and it was close to this spot, the residence of the few French inhabitants of the island, that I had landed. The anchorage, say the French, is deep, 8 or 10 metres, and the waters are always calm.

3.—*On the Specific Gravity of the Water of the South Atlantic.** By Samuel White Hodding.

The chief differences in oceanic specific gravity arise from rainfall and evaporation. The increase or diminution of change caused by the latter is quite apparent from daily observation, but when a region of ten degrees square is taken to mean observations, and the results found carried on to the adjacent regions similarly treated, the effect of the relative degree of evaporation is marked and interesting. For some years past I have made a practice of taking observations of the dry- and damp-bulb thermometers every two hours throughout the twenty-four. These have been registered in the same latitudes on three following voyages at the same season of the year, and when duly meaned enable me to point out their value in showing the relative degree of moisture prevailing over the regions traversed on our homeward route. The comparison of the differences between the two thermometers with the change in specific gravity is especially worthy of note, and may be clearly traced in the following table, in which observations are entered which are taken in the parallels between 35 S. and 30 N.

Atlantic Ocean.			Specific Gravity.	Difference of Dry and Wet Bulbs.
				°
Between 35° S	and	30° S	·02579	3·6
,, 30°	,,	20°	·02638	4·5
,, 20°	,,	10°	·02717	5·0
,, 10°	,,	0°	·02686	4·6
,, 0°	,,	10° N	·02623	3·5
,, 10°	,,	20°	·02655	3·7
,, 20°	,,	30°	·02754	4·4

By this table it is shown that—

An increase of	0·9°	between the thermometer	gives an increase of ·00059
,,	0·5°	,, ,,	,, ·00079
A decrease of	0·4°	,, ,,	a decrease of ·00031
,,	1·1°	,, ,,	,, ·00063
An increase of	0·2°	,, ,,	an increase of ·00032
,,	0·7°	,, ,,	,, ·00099

From these figures it appears that an *increase* in the amount of evaporation has more effect in *increasing* the range of specific gravity than a decrease has in diminishing it; showing, it would seem, a tendency of sea-water to establish its equilibrium more easily when disturbed by rainfall than when rendered heavier by an increase of evaporation. From the six observations in the last table, the four cases of increase against the two of decrease give the following result:—

An increase of 0·575° causes an increase in specific gravity of ·000672,

but

A decrease of 0·75° only causes a decrease in specific gravity of ·000470.

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* Extracted from a Memoir communicated to the Society by the author, 'On the Currents and Specific Gravity of the South Atlantic.'

One cause, therefore, appears to have double the effect of the other; according to this, the change for the even degree would be—

Change of 1° + would give change in specific gravity + ·001253
,, 1° − ,, ,, ,, − ·000626.

I believe that a large number of observations extending over several years would enable one to establish a proportionate ratio of change in specific gravity depending on the degree of evaporation. The suggestion I brought forward just now, on the apparent tendency of sea-water to regain its equilibrium more easily under one cause of disturbance than another, is one that cannot be satisfactorily proved by the comparatively limited number of the observations.

There are other causes which alter the range of specific gravity besides the effects of rainfall and evaporation; there is an illustration of this in the great Southern Ocean. I allude to the melting icebergs, which, breaking adrift from the Antarctic continent, are borne northward till they arrive in temperate regions, where they soon become part of the ocean they hitherto floated in. There are two great ocean currents in the southern hemisphere, well known to seamen under the names of the Mozambique and the Antarctic, or icebearing, currents. The meeting of these two currents being often very abrupt, a large amount of latent heat is set free on the condensation of vapour near the limits of the tropical current, giving rise to storms and other meteorological phenomena so frequently experienced by seamen in rounding the Cape. The specific gravity of the Antarctic current is, as might be expected, lower than that of the Mozambique. Observations on three winter voyages prove this fact; the results are:—

	West of Cape Agulhas.			East of Cape Agulhas.	
	Spec. Grav.	Temperature.		Spec. Grav.	Temperature.
1st Voyage ..	·02544	62·0	....	·02578	69·7
2nd ,, ..	·02523	58·7	....	·02557	67·3
3rd ,, ..	·02669	59·3	....	·02726	67·8

These observations are taken between 30° s. and 35° s., and show that on each voyage the specific gravity falls on entering the cold waters of the Polar current.

Here is the mean of the three voyages:—

West of Agulhas.			East of Agulhas.	
·02579	60·0	....	·02620	68·3

The difference is certainly small (·00041), rather less than half a degree on the scale of the hydrometer, but yet the same differences exist on each voyage, one confirming the other. Perhaps the small difference may arise from taking my observations too near the limits of either current, but ships homeward bound do not, as a rule, remain long in these latitudes, hence so limited a number of observations.